

EMFAC2002

On-Road Emissions Inventory Model

Model Release
Informational Session
November 7, 2002 - El Monte

Presented by:
The Mobile Source Analysis Branch
Planning and Technical Support Division



Agenda

- Welcome
- Need for Updated Inventory
- Summary of Most Current EMFAC
- Modifications to the most current EMFAC
 - ◆ Revised Evaporative Emissions Schedule
 - ◆ Correction to 2007+ PM Emission Rates
 - ◆ Passenger Car Accrual Rates
 - ◆ Revisions to I/M Assumptions
 - ◆ Updated Activity (Speed Distributions)
 - ◆ Updated Activity (Vehicle-miles Traveled)
 - ◆ Tire and Brake Wear Emissions
 - ◆ School Bus Activity
 - ◆ Extended Idle (Heavy Duty Diesel and School Bus)
 - ◆ Monthly Average Fuel RVP and RFG II
 - ◆ Revisions to Population and Age
- Questions
- Discussion of Transmittal to U.S. EPA

Statewide (Tons per Day)	ROG total	CO	NO_x	PM total
EMFAC 2001 Baseline	616	5756	965	56.6
Revised Evaporative Emissions Schedule	0	0	0	0
Correction to 2007+ PM Emission Rates	0	0	0	-1.5
Passenger Car Accrual Rates	-14	-211	-16	-0.1
Revisions to I/M Assumptions	+1	+11	+2	0
Updated Activity (Speed Distribution)	-4	-32	+23	-1.0
Updated Activity (Vehicle Miles Traveled)	+8	+68	+12	+0.8
Tire and Brake Wear Emissions	0	0	0	-5.7
School Bus Activity	+1	+12	+11	+0.5
Extended Idle (Heavy Diesel and School Bus)	+2	+9	+26	+0.5
Monthly Average Fuel RVP & RFGIII	0	0	0	0
Revisions to Population and Age	-71	-416	+21	+0.4
New Baseline—EMFAC2002	539	5197	1044	50.5

Revised Evaporative Emissions Schedule

- EMFAC2001 incorporated latest LEVII and federal TIER2 assumptions for exhaust.
- Related modifications were not made for Evaporative Emissions (PZEVs).
- Overall effect on inventory = 0.1 tpd decrease in ROG in 2010, 10 tpd by 2030.

2007+ PM Adjustment

- Stringent new exhaust emission standards for heavy duty trucks beginning with the 2007 model year.
- Emission adjustments made for HC, CO and NOx in EMFAC2001.
- No change made for PM.
- Correction results in 1.5 tpd decrease in PM in 2010, 7 tpd by 2020.

Passenger Car Mileage Accrual Rates

- Mileage Accrual Rates (MAR):
 - ◆ Miles per year traveled by a vehicle as a function of age and area.
- Area specific MARs from I/M Data.
- EMFAC maintains relationship between MAR, vehicle population (Pop) and vehicle miles traveled (VMT).
 - ◆ $VMT = Pop * Mar$
- Adjustment made in EMFAC2000 to improve agreement between modeled and reported VMT.

Passenger Car Accrual Rates (Contd.)

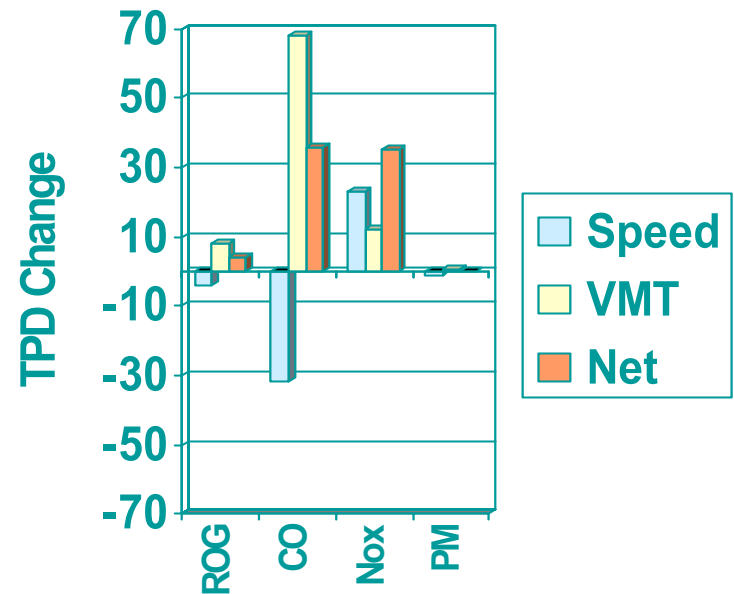
- Passenger Car MARs set equal to Light Duty Trucks.
- Adjustment caused VMT to be higher for older passenger cars in several areas.
- Pass Car MARs were reset in EMFAC2002.
- Modification results in 14 tpd reduction in ROG, 211 tpd for CO, 16 tpd reduction for Nox and 0.1 tpd reduction in exhaust PM in 2010.

Revisions to I/M Assumptions

- EMFAC2001 carried an assumption of more stringent pass/fail criteria to be implemented in 2010.
- EMFAC2002 eliminates this assumption.
- The overall effect on the inventory is an increase of 0.7 tpd ROG, 10.6 tpd CO and 2.2 tpd NOx in 2010.

Updates to Activity (Speed and VMT)

- Latest information from COGs and MPOs on VMT and Speed Distribution (% of VMT by Speed) incorporated into EMFAC2002.



Tire and Brake Wear Emissions

- EMFAC uses standard ratios to scale passenger car emissions to other vehicle classes in some instances.
- The ratio of the exhaust emission standards was mistakenly applied to tire and brake wear in previous versions.
- Correction results in a reduction of 5.7 tpd PM in 2010.

School Bus Activity

- EMFAC assumes school buses only operate during two daily time periods:
 - ◆ Between 6:00 and 9:00 a.m.
 - ◆ Between 3:00 and 6:00 p.m.
- All operation occurring between 9:00 a.m. and 3:00 p.m. and 6:00 p.m. and 6:00 a.m. was discarded.
- Redistributing this activity results in an increase of 1, 12, 11 and 0.5 tpd for ROG, CO, NOx and PM, respectively in 2010.

Extended Idle for Heavy-Duty Trucks and Buses

- EMFAC2000 included Idle as separate process.
- Idle activity was limited to “key-on” to “key-off” events with no appreciable movement to avoid double counting.
- Analysis of instrumented truck data suggests average truck idle time of 104 minutes per day compared to 13 minutes per day in EMFAC2000.
- Inclusion of Extended Idle results in an increase of 9 tpd CO and 26 tpd NO_x in 2010.

Monthly Average Fuel RVP and RFGIII

- Modification to estimate of average RVP during transition from “summer” to “winter” months.
- Delay in introduction of RFGIII
- Changes do not impact the summertime 2010 inventory.

Changes to Vehicle Population and Age Distribution

- Vehicle population information provided by California Department of Motor Vehicles.
- EMFAC 2001 utilized 1997 and 1998 data extractions.
- EMFAC 2002 updates population with latest information available in 2002.

Population and Age Distribution (Contd.)

- Database screened for:
 - ◆ Duplication
 - ◆ Non Qualifying Fuel Types
 - ◆ Off-Road Vehicles
 - ◆ Vessels
 - ◆ Trailers
- Remaining Data sorted by Geographic Area Index (69)
- Out of State and Out of Country addresses discarded.

Population and Age Distribution (Contd.)

- Vehicles are sorted into major categories
 - ◆ Passenger Cars
 - ◆ Buses (Transit/School)
 - ◆ Motorcycles
 - ◆ Motor Homes
 - ◆ TRUCKS
- Trucks are further divided by weight
 - ◆ Light Truck 1 Light Truck 2
 - ◆ Medium Truck Light Heavy 1
 - ◆ Light Heavy 2 Medium Heavy Truck
 - ◆ Heavy Heavy

Population and Age Distribution (Contd.)

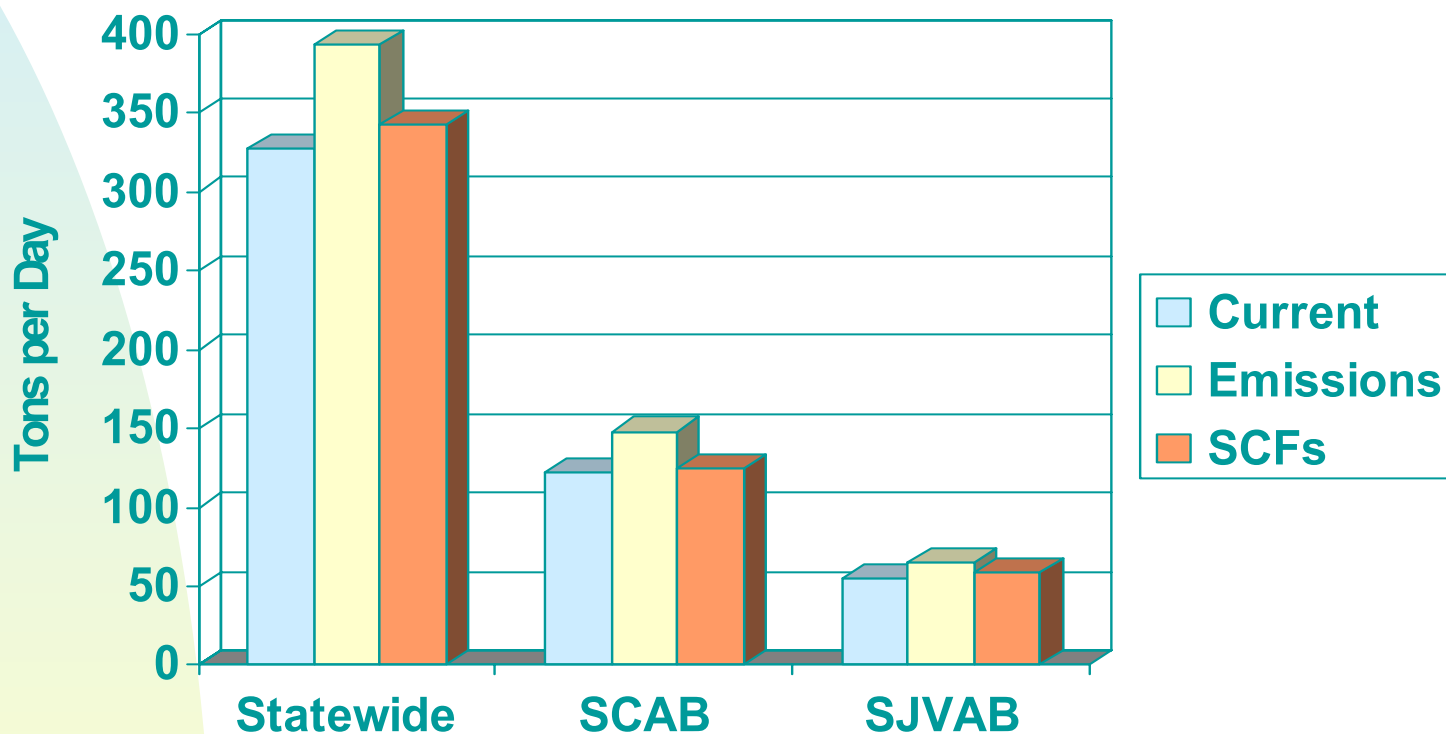
- Truck weigh designation made by:
 - ◆ DMV Weight Code
 - ◆ Manufacturer/Model Information
 - ◆ VIN Decoder
- Vehicles sorted by fuel type:
 - ◆ Gas
 - ◆ Diesel
 - ◆ Electric
- Vehicles sorted by Age:
 - ◆ 1-45+

1999 Vehicle Population			
Vehicle Class	Weight Class (GVW)	EMFAC2001	EMFAC2002
Passenger Car	All	14,068,400	12,302,560
Light-Duty Truck 1	0 - 3,750	2,123,660	3,277,646
Light-Duty Truck 2	3,751 - 5,750	3,758,850	3,362,701
Medium-Duty Truck	5,751 - 8,500	1,595,970	1,483,471
Light-Heavy-Duty Truck 1	8,501 - 10,000	261,618	230,160
Light-Heavy-Duty Truck 2	10,001 - 14,000	79,379	75,656
Medium-Heavy-Duty Truck	14,001 - 33,000	255,519	225,792
Heavy-Heavy-Duty Truck	33,001 +	168,663	136,695
School Bus	All	28,022	23,559
Transit Bus	All	13,534	25,399
Motor Home	All	150,398	266,205
Motorcycle	All	337,146	380,629
Total		22,841,159	21,790,473

Heavy-Duty Truck Testing

- 25 Heavy-Heavy Duty Diesel Trucks tested in recently completed project.
- Two issues raised:
 - ◆ NOx emission rates based on current data may be underestimated.
 - ◆ Current model may not adequately reflect “off-cycle” NOx emissions.
- Internal analysis / Meetings with external experts is on-going.

Heavy-Heavy Duty Truck NO_x Inventory (Running Exhaust in Tons per Day)



Transmittal to U.S. EPA

- EMFAC2002 will be used for the upcoming series of SIP updates
- Federal transportation conformity rules require U.S. EPA to approve emissions models used to assess conformity with these SIPs (40 CFR 93.111)
- Timely U.S. EPA approval of EMFAC2002 is needed to avoid risk of losing transportation funds
- Transmittal planned for November 2002

Contacts

- ◆ **Bob Fletcher, Chief Planning and Technical Support**
Tel: (916) 322-5350 E-mail: rfletche@arb.ca.gov
- ◆ **Mark Carlock, Chief Motor Vehicle Analysis Branch**
Tel: (626) 575-6608 E-mail: mcarlock@arb.ca.gov
- ◆ **Jeff Long, Manager Analysis Section**
Tel: (626) 450-6140 E-mail: jlong@arb.ca.gov
- ◆ **Archana Agrawal, Manager Off Road Modeling**
Tel: (626) 450-6136 E-mail: aagrawal@arb.ca.gov
- ◆ **Dilip Patel, Programming Coordinator**
Tel: (626) 450-6141 E-mail: dpatel@arb.ca.gov
- ◆ **Ben Hancock, Analysis Section**
Tel: (626) 575-6805 E-mail: bhancock@arb.ca.gov
- ◆ **Doug Thompson, QA Coordinator**
Tel: (916) 322-7062 E-mail: dthompso@arb.ca.gov
- ◆ **Tess Sicat Documentation Coordinator/Website Design**
Tel: (916) 327-0027 E-Mail msicat@arb.ca.gov

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